



**Directorate of  
Intelligence**

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# **Science and Weapons Daily Review**

**Tuesday  
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## Science and Weapons Daily Review

USSR: OCEAN EDDY RESEARCH HAS ASW APPLICATIONS

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Moscow Domestic Service reported in April 1985 that an Academy of Sciences' Institute of Oceanology expedition had begun experiments in the eastern Atlantic Ocean. Three ships--the Akademik Keldysh, the Akademik Kurchatov, and the Vityaz--were to investigate mesoscale eddy formation and behavior. (Mesoscale eddies are oceanic rings, up to hundreds of kilometers wide and a few thousand meters thick that spin off ocean currents.) The report cited increased understanding of global climate and weather, and improved navigation as expedition goals.

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Eddies influence sound propagation because their temperature, and sometimes their salinity, differs markedly from that of the surrounding water. Temperature and salinity are two of the three variables (pressure is the third) that regulate the speed of sound in sea water.

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Submarine detection at sea is complicated greatly by temperature and salinity anomalies, which affect sound refraction and channeling. If a submarine is aware of these anomalies, it can move to a different water mass than the ASW platform, and, thereby, minimize the chance of discovery. Conversely, an ASW platform can use knowledge of ocean temperature and salinity to calculate theoretical propagation paths, and place its sensors appropriately to optimize the likelihood of detection. Eddy formation, movement, and dissolution has been a focus of Soviet oceanographic research for the past decade. We expect this emphasis to continue, if not intensify, for the foreseeable future.

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